

UNCLASSIFIED

**NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD (NITFS)
REQUEST FOR CHANGE (RFC)**

RFC CONTROL NUMBER 96-021
(To be filled in by NTB Secretary)

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ORGANIZATION TYPE.

PRIORITY

FUNCTION

DOCUMENT NUMBER MIL-STD-2500A PAGE
DOCUMENT NATIONAL IMAGERY TRANSMISSION PARAGRAPH
FORMAT (VERSION 2.0)

PROBLEM DESCRIPTION

Add new controlled tag.

TRANSFORM SUBIMAGE (XFMSIA) a proposed new NITFS 2 controlled tag for image subheader.

SEE ATTACHMENT

RECOMMENDED WORDING

RATIONALE

REMARKS

00/00/00

TOTAL COST OF IMPLEMENTATION

PROPOSED TIMEFRAME OF IMPLEMENTATION

ANTICIPATED USER IMPACT

NTB REVIEW DATE 00/00/00

NTB RECOMMENDATION

DATE SUBMITTED TO ISMC 00/00/00
ISMC REVIEW DATE 00/00/00

DATE SUBMITTED TO DISA 00/00/00

ISMC DECISION

IMPLEMENTATION DATE 00/00/00

CR-96-021 Attachment

“TRANSFORM SUBIMAGE” (XFMSIA) a proposed new NITFS 2 controlled tag for image subheader.

Purpose: An addendum to support the RULER mensuration. Conveys an NITF image relationship to the whole operation image. RULER uses the line/sample coordinate of the whole operation image as inputs for mensuration. RULER recognizes segments as well as IMPs, however, RULER uses the segment ID and the IMP ID to validate the inputs not to convert the NITF image offsets to the line/sample pair of the whole operation image. For images with multiple scan blocks, Ruler expects the line/sample inputs from a particular scan block instead. It is the responsibility of the workstation software to provide the proper inputs to the RULER. This tag will provide the necessary information so that RULER can be used on the NITF image. For images with multiple scan blocks, this tag will also indicates that if the line-sample pair reflects the whole image with multiple scan blocks, or just the particular scan block.

Due to various specification for each particular system, the rule to define the relationship is very complex and uncompleted. For example:

- a. If the NITF image is a full segment or an IMP, then the relationship of the NITF image offsets to the line/sample of the whole operation image is defined by the SDE tags.
- b. If the NITF image is a chip from a full segment image or from an IMP on FAF boundary without rotation nor scaling and is generated according to S2035, then the relationship of the NITF image offsets to the line/sample of the whole operation image is also defined according to S2035 guide line. Unfortunately, S2035 never specifies how to define that an NITF image is generated according to S2035 specification.
- c. If the NITF image is a chip from a full segment image or from an IMP on FAF boundary without rotation nor scaling but is NOT generated according to S2035, then the relationship of the NITF image offsets to the line/sample of the whole operation image is undefined.
- d. If the NITF image is not chipped on FAF boundary or is rotated or zoomed, there is no control tag to convey the relationship of the NITF image to the full operation image so that RULER can be used properly.

With the current tag, there will be a uniform way to define the necessary relationship of the NITF image offsets to the line/sample of the whole operation image.

Some example producers of (the proposed) XFMSIA are Systems conforming to USIS 2000's NITFS 2 w/SDE standards, e.g., DDS III, future MDS, LCM, CAWS (e.g., DIEPS w/RULER), IDEX ODS, and IDEX STAR.

Definition: Table I, below, follows the example in MIL-STD-2500A paragraph 5.1, Format Description. The ROW and COLUMN are the image offset of the specific NITF image and shall be 0 to (NROWS - 1) and 0 to (NCOLS - 1), respectively. Where the NROWS and NCOLS are the number of rows and columns, respectively, of the NITF image. The LINE and SAMPLE are the pixel number for the along and cross scan, respectively, of the whole operation image for the center of the pixel at (ROW,COLUMN) of the NITF image.

FIELD	NAME	SIZE	VALUE RANGE	TYPE
CETAG	Tag Name	6	XFMSIA	R
CEL	Length of Entire Tag	5	177-39927	R
SCANBLOCK	Number of Scan Block	2	0-99	R
NOPOINTS	Number of Transform Points	4	4-999	R
ROW1	NITF Image Row Offset of Point 1	8	0-99999999	C
COLUMN1	NITF Image Column Offset of Point 1	8	0-99999999	C
SAMPLE1	Sample Number of Whole Op for Point 1	12	0.01-99999999.99	C
LINE1	Line Number of Whole Op for Point 1	12	0.01-99999999.99	C
ROWnnn	NITF Image Row Offset of Point nnn	8	0-99999999	C
COLUMNnnn	NITF Image Column Offset of Point nnn	8	0-99999999	C
SAMPLEnnn	Sample Number of Whole Op for Point nnn	12	0.01-99999999.99	C
LINEnnn	Line Number of Whole Op for Point nnn	12	0.01-99999999.99	C

Table I. Definition of XFMSIA tag.

Discussion.

Number of Scan Block shall be zero for images without multiple scan block or the line-sample is the offset of the whole image with multiple scan block. This number shall be 1 through the maximum of number scan blocks possible, if the line-sample are referring from the particular scan block.

Number of Transform Points ranges from 4 to 999. With 4 transform points, the rotation angle, scale factor, linear translation offsets, and stretch/squeeze factor due to pixel asymmetry of the NITF image can be derived and thus the workstation software can transform from the image offsets to the inputs expected by RULER. If the image has been warped such as the NITF images generated by STAR, a large set of points can be provided so that the receiving workstation can properly de-warp the pixel coordinate before RULER is called.

The current NITFS 2 standard does not provide a means to pass subimage rotation and offset referenced to a full operation image. Several systems are relying upon the image ID to determine segment number and, in the case of DDS III, IMP starting and ending FAF numbers. In some cases, the image ID is implied by a file name which is an unreliable method of conveying image ID. The SI has approved a variation of image ID for depicting chips. This opens a “Pandora’s box” in that the interpretation of an image ID is now dependent upon what system generated the image - that is, different conventions apply. For example, an image ID for an RRDS member (e.g., the IDEX ODS) may have starting and ending FAFs for an aggregation mode corrected image which are inconsistent with the same pixel FAFs in an uncorrected R0. When conveyed via the image ID/filename, gross errors are possible.

A better method is to assume that the 24 character image ID is always correct and that the segment number is correct in the ID. The starting/ending FAFs should be ignored due to the irregular definition now in place. The extents of the subimage should be consistently and well defined by the SDEs with the addition of the proposed XFMSIA tag.

When a chip image is generated from a full segment image or an IMP, operations to both spatial domain and pixel domain shall be saved, so that the workstation software can properly display and connect to RULER. The I2MAP tag covers both spatial domain and pixel domain processing by IDEX, however, it contains specific IDEX parameters and can not be generated by other primary systems nor any CAWS workstation for NITF images. The pixel domain processing such as pixel intensity mapping, tone transfer, DRA, etc. are still very much system dependent for IDEX and different CAWS package and needs more consensus building. This XFMSIA tag only addresses the spatial domain processing done by the producer workstation and is completely system independent and can easily be generated by any producer as well as processed by any receiving workstation software.

DIEPS, as a representative CAWS, of necessity has separate menu selections to import a TFRD image according to what system produced the image (due to image ID differences). Rotated chips from DIEPS can be RULER-mensurated by a receiving DIEPS but only if the image exchange is in DIEPS format (lacking an NITFS 2 tag as XFMSIA, herein).